ENTOMOLOGY.[1]

Antennæ of Lepidoptera.—Mr. Donaldson Bodine summarizes[2] his studies of the antennæ of Lepidoptera as follows:

1. "Muscles in the head move the scape; muscles in the scape move the pedicel; distad of the scape no muscles have been demonstrated, and the clavola is, therefore, capable of motion in itself only when acted upon by some external force causing a flexure and a subsequent extension.

2. Besides organs for protection there are at least six types of sense organs situated in the antennæ, and all but one are developed from a simple sense-hair, inserted at the ectal end of a pore canal through which it is connected with a multinuclear sense-cell.

3. The antennæ doubtless function as sense organs of touch, smell and hearing, although those senses are not subject to the same limitations as in the higher animals and may be considerably different in their range of perception.

4. The antennæ show that all Lepidoptera are descended from one primitive stem form, of which we may predicate the more essential feature of structure.

5. The evolution of ventral expansions, of pectinations, of the chitinous surface, of the sense organs shows an increasing differentiation of structure following the demand for increasing specialization of function.

6. In the more essential features, the evidence of the antennæ of all the families of the Lepidoptera confirms the provisional classification based upon the wing structures, though in a number of cases it indicates a change in the relationships of the families."

Sleeping Trees of Hymenoptera.—At a recent meeting of the Entomological Society of Washington, Mr. E. A. Schwarz reported these interesting observations.[3] In Texas during April and May two species of bees, *Melissodes pygmæus* Cress. and *Cœlioxys texanus* Cress. were seen at 7.30 A. M. sleeping on dead bushes, mostly *Celtis pallida*. It is on the thinnest, outermost twigs and more particularly on the stout thorns with which this shrub is liberally provided that single sleeping

[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

[2] Trans. Am. Ent. Soc., XXIII, 47.

[3] Proceedings, IV, 24.

specimens of these bees are found. Their position is uniform; the twig or thorn is grasped tightly with all of the six legs, and, in addition the mandibles are widely opened and with their tips firmly inserted into the wood. It requires some force comparatively speaking to dislodge the bees from their position. * * * On the very first day I found that there are certain dead shrubs which serve as sleeping quarters for a multitude of the bees. In the course of time I discovered within a short distance four shrubs (or dwarf trees) upon each of which from 50 to 70 specimens of the sleeping bees could be seen every morning, and several other shrubs which harbored a smaller number of specimens with plenty of room for more. Here my third species the Sphegid *Coloptera wrightii* comes in. It was always on the sleeping trees in company with the bees, but not so numerous as the latter. I never saw it asleep at the hour I made these observations, but the specimens were, like watchmen, slowly walking up and down the twigs, over the bodies of the sleeping bees, carefully and deliberately touching and examining with their antennæ the bees, as if trying to arouse them from their sleep. If I had been on the spot at an earlier hour I would no doubt have ascertained also the sleeping habit of the Coloptera. A well-frequented sleeping tree presents a very striking and exceedingly pretty sight, which I never wearied of observing day after day."

Effectiveness of a Net in Excluding Insects.—Prof. F. Plateau has made a number of interesting experiments as to the effectiveness of a net in excluding insects, although the meshes were wide enough to allow their passage. His conclusions are: (1) A stretched net does not absolutely stop the flight of insects. (2) In their flight the insects behave as if they did not see the meshes. (3) Direct passage during flight is always rare; in most cases the insect stops and scrambles through, if at all. (4) The explanation is to be found in the lack of precision associated with compound eyes; the threads of the net, like etchings on an engraving produce the illusion of a continous closed surface.—*Journal Royal Micr. Society.*

Life-History of the Peach-tree Borer.—There is but one generation of larvæ of *Sannina exitiosa* annually. The moths appear as early as May in the latitude of Washington, D. C., and southward, over what approximates the lower austral region. In the upper austral region, roughly comprising the States above the cotton belt and below the northern tier, the moths do not appear until after the middle of June. In the transition region, which comprises the northern tier of States, together with most of New York and New England, the moths

appear chiefly in July and later, emerging, however, as early as June, and belated individuals as late as October. June and July are therefore the worst months for the moths over the principal peach districts.

The egg is deposited on the bark, usually at or near the surface of the ground, although rarely it may be placed well up on the trunk or in the crotches of the larger branches. The egg is very minute, not exceeding 0.2 mm. in length, oval, yellowish-brown in color, and irregularly ornamented with hexagonal sculpturing. The young larva on hatching is very active, and immediately burrows into the bark, usually entering at cracks. Having worked its way to the sapwood, usually near or below the surface of the ground, it feeds steadily through the balance of the summer and well into the fall, constantly enlarging its excavation, and causing the exudation of the gum intermixed with excrement and fragments of bark, which is so characteristic of its presence. It remains dormant in the larval state during winter and resumes feeding again the following spring, reaching full growth in the central districts by the middle of June. It transforms to chrysalis within an elongate, cocoon-like cell constructed of its own frass and particles of bark attached with gum and threads of silk. The moths emerge very shortly after the chrysalis state is assumed, usually only a few days intervening. The males appear a few days earlier than the females.—C. L. MARLATT, *Circular No. 17, Dept. of Agriculture.*

Smith's Economic Entomology.—Professor J. B. Smith has written and the Lippincott Company has published a valuable and readable book of nearly 500 pages with abundant illustrations. Its full title "Economic Entomology for the Farmer and Fruit-grower and for Use as a Text-book in Agricultural Schools and Colleges" indicates its scope and purpose. It is divided into three parts the first devoted to the structure and classification of insects; the second to the classification and life-histories of insects, and the third to insecticides, preventives and machinery. Eight chapters are devoted to the first part, nine to the second and five to the third. The book is an admirable resumé of the present status of economic entomology, and will prove especially helpful in those agricultural colleges where the course in entomology is too short for the use of Comstock's excellent manual.—C. M. W.

Oceanic Migration of a Dragon-fly.—Robert McLachlan[4] records the taking of many specimens of the Dragon-fly *Pantala flavescens* F. on the P. and O. Steamer "Victoria" in the ocean 290 miles from

[4] Ent. Monthly Magazine, VII, 254.

Kealing Island. "The insects were observed *at night and during heavy rain,* suggesting nocturnal migration with the possibility that they were seeking shelter from the rain, or were attracted by lights in the cabin. This power of extended migration will also account for the extension of the species over the whole intertropical zone, and far beyond it on either side."

EMBRYOLOGY.[1]

Movements of Blastomeres.—In a lengthy and detailed paper Professor Roux[2] gives the results of certain experiments upon the isolated cells of the morulas and young gastrulas of the frog. In previous papers he had shown that when the cells are teased apart in solutions of salt or of white of egg they may move together again, traversing short distances without any apparent means. He considered that cells attracted one another somewhat as do sperm and ovum and relegated such attractive phenomena to the field of chemical influences.

In the present paper minute and rigorously classified descriptions are given of changes which such cells undergo when once they have come into contact.

In general two or more cells in contact glide, or crawl as it were, upon one another into some new relative position. This movement of one or both may be accompanied by a revolving or waltzing, very slowly. The form of the cells becomes changed very markedly, as is especially well shown when three cells form a row. In this case the middle one is very much compressed, as if the cells crowded together with great force.

The rearrangements and changes of shape are in some cases much as take place with soap bubbles and might be explained as the resultant of the surface tensions of the separate bubbles or cells. But in many cases the arrangements are directly opposed to the laws governing the arrangements of soap bubbles and cannot be explained on so simple a basis.

Besides the external changes in form and position there are internal changes, as is made evident by the changes in position of the pigment. In such cells as have more or less pigment this may recede from the surface to appear again in concentrated form at some one region of the

[1] Edited by E. A. Andrews, Baltimore, Md., to whom abstracts reviews and preliminary notes may be sent.

[2] Archiv f. Ent. d. Org., III, June 12, 1896, pps. 381–464.